MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2017/2018

PEM0016 – ALGEBRA

(Foundation in Engineering)

06 JUNE 2018
9.00 a.m to 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **3** pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Answer ALL the questions (100 marks).

Question 1 (25 Marks)

(a) Solve for x in the equation: $\sqrt{3x-3} = \sqrt{x+2} + 1$.

(Round up any fractions/roots up to 3 decimals throughout the computation).

(10 marks)

(b) Solve for y in the inequality: $\dfrac{y^2-5}{y^2+3y-10} \leq 1$. (8 marks)

(c) Solve the following equation by using quadratic in form.

$$2x^{2/3} - 3x^{1/3} - 2 = 0$$

(7 marks)

Question 2 (25 Marks)

(a) For the following functions of $f(x) = \dfrac{100}{x^2+5}$ and $g(x) = \sqrt{x-3}$, determine the following:

(i) Domain for $f(x)$ and $g(x)$ (4 marks)

(ii) $(g \circ f)(2)$ (4 marks)

(iii) $(g \circ f)^{-1}(2)$ (6 marks)

(b) Using function transformation techniques, sketch a graph for $f(x) = -2.5|x+10| + 20$. Show all stages of graphing transformation with at least two coordinates on each transformation stage.

(11 marks)

Continued...

Question 3 (25 Marks)

(a) Given a polynomial function, $f(x)=x^4-9x^2+4x+12$.

(i) Given that $(x+3)$ and $(x+1)$ are the factors of $f(x)$. Determines all the zeros.

(7 marks)

(ii) Sketch $f(x)$.

(4 marks)

(b) Find the partial fraction decomposition of $\dfrac{-x^2+2x-5}{(x^2+2x+3)(2x-1)}$.

(10 marks)

(c) Determine the term containing x^5 in the expansion of $(2x-1)^{10}$.

(4 marks)

Question 4 (25 Marks)

(a) Solve the following equations by using **inverse matrix method.**

$$\begin{cases} 3x+y-z=6 \\ 3x-4z=14 \\ x-2y+5z=-41 \end{cases}$$

(17 marks)

(b) Use Cramer's rule to solve the following linear equations.

$$3x+2y=11$$
$$x-3y=11$$

(5 marks)

(c) Given the following matrices

$$A=\begin{bmatrix} a & 2 \\ 1 & 4 \end{bmatrix} \quad B=\begin{bmatrix} -1 & 5 \\ 0 & -2 \end{bmatrix}$$

Provided $|AB|=20$, determine the value of a.

(3 marks)

End of Paper